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PSYCHOLOGY AND SCIENTIFIC METHODS

THE WORK OF HENRI POINCARÉ

WHEN Henri Poincaré, already a member of thirty-five learned societies, was admitted in 1909 to the Académie Française, to the place left vacant by the death of the poet, Sully Prudhomme, M. Masson recounted in the words of a distinguished scientist the career of this master "whose reputation," he said, "is established as an axiom."

"M. Poincaré has a vast mind. He is remarkable both by the diversity and the depth of his knowledge. He is not only a geometer, but also a physicist and an astronomer, not in the fashion of those scientists who give themselves up to observations and experiments, but by the applications he has made of analytic method to science; in other words, he has advanced mathematical physics and celestial mechanics.

"As a geometer, his writings on the theory of numbers, on integral calculus, and on the general theory of functions are spread through more than one hundred and fifty Notes published in the *Comptes Rendus* of the Académie des Sciences, and at least as many articles and memoirs in French and foreign mathematical journals.

"Professor of mathematics at the University of Paris, he has published fourteen volumes of lessons on light, electricity, thermodynamics, and the propagation of heat, making known in France the theories of Maxwell as substantiated by Herz. He has not even neglected wireless telegraphy—an application of the Herzian waves.

"Also on the astronomical side he has shown much originality; there, his studies on the form that a fluid mass takes in rotation and submitted to universal gravitation have led to interesting theories concerning the breaking apart of the earth and moon, and on the formation of diverse variable stars; his work on the stability of the solar system has led, by a revision of the calculus of Laplace and by an approximation pushed still farther, to the proof that the theory as formulated in 1784 is absolutely justified. The three volumes that he has published on celestial mechanics are authoritative amongst astronomers."

In addition, there had also appeared three remarkable volumes[1] in which the philosophic significance of science is studied with rare depth and from which emerges the most profound analysis of knowledge, perhaps, that it may be the good fortune of our age to possess. Yet, in 1913, when four distinguished French scholars unite[2] to review the achievements of H. Poincaré lamentably brought to a close by death on July 17, 1912, much more is still to be told. Not only have significant scientific publications followed those already enumerated, but also another volume of papers[3] of the highest interest to philosophers is added to the list.

Langevin sets forth the dominant characteristics of Poincaré's mind;[4] "His extraordinary power of abstract construction is equilibrated by a constant care for reality; he is a realist in mathematics as in physics. The tree of his thought, branched to infinity, is solidly attached to the soil by deep roots. . . .[5] Henri Poincaré was never troubled by the difficulties of analysis; he knew them scarcely more than nature herself knows them, and he never lost contact with her." If his work lacked unity on the mathematical side it was because he appreciated the adage of Hermite[6]—" 'We are servants rather than masters in mathematics.' . . . The history of the work of Poincaré is nothing else than the history of mathematical science and the problems that it has placed in our epoch." For him science was so much a living thing that growth of a part was not to be distinguished from growth of the whole. No one understood better than he how the solution of a single problem spreads its influence, like the splash of a stone in a pool, until it permeates the whole.[7] "An experiment of Kaufmann on radium revolutionized at the same time mechanics, optics, and astronomy." A discovery by Poincaré in geometry, that "came" while stepping into a 'bus,'[8] has revolutionized our conception of the earth and of the generation of the heavens themselves.

To follow the technicalities that substantiate such work as Poincaré's is a task too difficult for those not deeply versed in the lore of the mathematical and physical sciences. Indeed, even the able expositors of the *"Revue de Métaphysique et de Morale"* frequently

[1] "Science et Hypothèse," 1902; "La Valeur de la Science," 1905; "Science et Méthode," 1907.

[2] *Rev. de Mét. et de Mor.*, September, 1913. L. Brunschvieg, "Le Philosophe"; J. Hadamard, "Le Mathématician"; A. Lebeuf, "L'Astronome"; P. Langevin, "Le Physicien."

[3] "Dernières Pensées," 1913.

[4] *Rev. de Mét. et de Mor., loc. cit.*, page 687.

[5] *Loc. cit.*, page 696.

[6] Hadamard, *loc. cit.*, page 618.

[7] *Sci. et Mét.*, page 310.

[8] *Sci. et Mét.*, page 51.

impress upon our minds no more than a few baffling phrases—Fuchsian, meromorphic, and thêta functions; curves defined by differential equations, equations with partial derivatives; molecular tensions, capillary attractions, Herzian resonators, convection currents, etc., leaving us scarcely more informed than we were from M. Masson's summary. Yet most of these things have their root in a doctor's thesis of 1879, or the papers that appeared during the next two or three years! And "the accumulation of these memorable works is not their only characteristic. The god who inspired them manifests his impatience in their very style. In a number of them . . . two or three pages, luminous as concise, suffice for the '*veni, vedi, vici*' of a triumph of the human spirit."[9]

Throughout we feel the scientist in love with truth and a man of faith, for all scientists "are in a sense men of faith; every passion supposes a faith; every motive of action is a faith; it is faith alone that gives perseverence, that gives courage. But, nevertheless, one is not a scholar if one is not endowed with a critical spirit which seems to exclude every sort of faith and often causes men of science to be taken for skeptics."[10] His conclusions are models of caution. Now he reviews Arrhénius's hypothesis by which the universe might escape that calorific death predicted by Claudius, and concludes that, at most, we can infer a mere retardation of the process; or again he examines cosmological theories only to end in interrogation, since all, including his own, fail to take account of some known fact.[11] Yet M. Poincaré does not lose faith in speculation. Had man been content to await adequate data of knowledge, he would have lacked that imperious curiosity that raises him through science above the savage. This curiosity is the incentive to work and "however well endowed a man may be, it amounts to nothing without work; those who have received the sacred spark from heaven are no more exempt than the others; their very genius only cuts out their work for them."[12]

It is, however, M. Poincaré's reflections on the nature and significance of science that especially concern the philosopher, for he has rare acumen and an acquaintance with the subject-matter with which he deals such as is almost unique in our literature. There have been as keen philosophers and as learned scientists, but, with the exceptions of Aristotle, and possibly Leibnitz, such intensity of philosophic interest and scientific creativeness have never before been united in one man. The unwary reader, however, should be warned that from the appearance of "Science et l'Hypothèse" in 1902 to

[9] *Rev. de Mét.*, pages 634–35.

[10] "Savants et Ecrivains," page v.

[11] Leçons sur les Hypothéses Cosmogoniques," 1911–13.

[12] "Savants et Ecrivains," page iv.

that of the "Dernières Pensées" in 1913 there is manifest an unfolding of the results of analysis that often betrays the unprepared, for it is easy to pigeon-hole his earlier works as an expression of a phenomenalistic relativism that is far from their real import.

"For the superficial observer," "Science and Hypothesis" begins, "scientific truth is beyond the possibility of doubt; the logic of science is infallible, and if the scientists are sometimes mistaken, this is only from their mistaking its rules." When we look a little more closely this confidence vanishes. We find the scientist everywhere depending upon assumptions and these assumptions are by no means as stable as one might think. It is not a question of such simple outlived ideas as defined for antiquity the shape of the earth or the movement of the heavenly bodies, but of Carnot's principle, of the principle of the relativity of space, or Newton's principle of the equality of action and reaction, of Lavoisier's principle of the conservation of mass, and even of Mayer's principle of the conservation of energy. We can not as yet predict the outcome in particular instances, but such present doubts illustrate the instability of the most fundamental certainties that science can contribute to our knowledge.

What shall we do? Deny everything? "To be skeptical in this fashion is still to be superficial. To doubt everything and to believe everything are two equally convenient solutions; each saves us from thinking."[13] But a superficial acquaintance with the results of science convinces us that even our discarded hypotheses have been useful. New science, then, if it is to transcend our present science, must keep alive something of it or our old science will persist by the side of it. Our formulæ are like the victims of Kipling's vampire, for some of them live, though most of them die, and it is experiment alone through which these things are found out. But M. Poincaré is fond of pointing out that experiment is not everything unless it be understood to be something more than a mere quest of observations. The observations must be used, and to be used they must be generalized. Carlyle's love of mere fact was unworthy of a countryman of the man who invented the phrase *experimentum crucis*. No heap of facts constitutes science, but rather an organization of facts. It is science that enables us to predict, and a single observation by a wise scientist like Pasteur can tumble into oblivion all the crowd of facts a lesser mind might amass in a lifetime. Bacon would have understood this, but not Carlyle. At best experiment gives us only a number of isolated points. To reduce these to law we must join them by a continuous line, but "the curve we trace will pass between the observed points and near these points; it will not pass through the

[13] "Science et l'Hypothèse," page 2.

points themselves. Thus we do not restrict ourselves to generalizing the experiments, but we correct them; and the physicist who should try to abstain from these corrections and really be content with the bare experiments would be forced to enunciate some very strange laws.''[14]

Even mathematics is not exempt from this dependence upon fact. M. Poincaré seems never to weary of returning to attack the logicians, of whom B. Russell and Hilbert are leading representatives, when they would found mathematics on arbitrary definitions and postulates. The first chapter of ''Science and Hypothesis'' demonstrates the factual foundation of arithmetic, the second of geometry; the ''Value of Science'' begins with a discussion of the respective rôles of intuition and logic in mathematics; the second part of ''Science and Method'' recurs to the same problem and ends with the words, ''the old logistic is dead, so much so that already the zigzag theory and the no-classes theory (Russell) are disputing over the succession''; and chapters three, four, and five of the ''Dernières Pensées'' are at the problem again, emphasizing especially the conclusion that ''there is no logic or epistemology independent of psychology.''[15]

Mathematical propositions are, then, transcriptions of experience. It may be of psychological experience, such as our right to repeat a certain process indefinitely—the principle of complete induction—or of the conditions of movement which affect our geometrical interpretations of space; or again, they may express complex relations among physical objects, and often both psychological and physical experiences are invoked.[16] Incidentally he has contributed to the solution of the problem of the non-Euclidean geometries for the philosopher by showing that every one of their theorems is useful to solve problems of Euclidean geometry, thus extending the significance of Reimann's and Beltrami's proof that any fact expressed in Euclidean terminology could be expressed by any non-Euclidean system, and *vice versa;* and also the problem of hyperdimensional geometries similarly by showing that any equations expressing facts of space in terms of three dimensions can be translated into equations expressing those same facts in terms of N-dimensions, although, of course, the dimensions would not remain the same entities (lines). The consequence is that geometries are only languages and our choice of geometries is based merely on convenience.

But this does not mean that the choice is arbitrary. ''It is true that it is convenient, it is true also that it is convenient

[14] ''Science et l'Hypothèse,'' Ch. IX.

[15] ''Dernières Pensées,'' page 139.

[16] *Cf.* ''Why Space has Three Dimensions,'' ''Dernières Pensées,'' Ch. III.

not only for me, but for all men; it is true that it will remain convenient for our descendants; it is true finally that this can not be by chance." The reason is that "all that the scientist creates in a fact is the language in which he enunciates it" and "scientific fact is only brute fact translated into a more convenient language."[17] Consider the four following statements of fact. They are M. Poincaré's freely transcribed. It is getting dark, says the man on the street; an eclipse is taking place, says the astronomer; the eclipse is a phenomenon that could have been deduced from tables derived from Newton's laws, says a mathematician; and the cause of it is that the earth revolves around the sun, says Galileo. All of these statements transcribe the same fact of experience. The first denotes a present experience in relation to what has just been experienced; the second relates a present experience to the great mass of past and future experiences; the third appeals to our powers of predicting and concatenating events; and the last is so stated that one who is sufficiently informed can see that Newton's tables are possible to construct and of guaranteed applicability to this present experience.

The purpose of our theories, accordingly, is not to describe things as they really are. They are not based on experience alone, but spring from a collaboration of intellectual activity and facts whose status is imposed by practical life. Their durability lies in their power to simplify and unify the relations between things, and their ephemeral aspect in their descriptive implications. When astronomers said that the earth was the central body about which the sun and stars revolved, they were saying nothing false except in so far as they might be taken as speaking descriptively. That is, if we look upon their theory merely as a formulation of certain relations that express themselves among visible objects in the open heavens and the visible earth, we find that it is a simple and unifying formula by which to record them. To the casual observer, the sun, moon, and stars *do* pass as they might if they revolved about the earth. The motion is a fact. The trouble comes when we look more closely and observe regressions and variations from the motion that is at first the only one apparent to the eye. We must then reconstruct our theory, and only then do we find that the helio-centric hypothesis has much more power to unify and simplify than the other, and we say it is true in a deeper sense. Naïvely we chose the most conspicuous objects and scientifically those simplifying the most expressions. The naïve statement is not false, but an awkward conveyance of truth.

This is the essence of Poincaré's identification of the truth with the convenient. In his last volume[18] he explicitly identifies the con-

[17] "La Valeur de la Science," Ch. X.

[18] "Dernières Pensées," pages 136 seq.–146 seq.

ception with pragmatism and elaborates the conception as implying that every statement that has a meaning must lead to some consequences verifiable in fact, and that in this consists its truth. Abstractions can be nothing but short cuts to getting into working relations with the concrete. Unfortunately, the issue is confused for the philosopher by an identification of pragmatism with idealism, and the opposed school, characterized as Cantorians, with the realists. These realists are more of the scholastic than of the modern type. Their realism is based on essences and universals, and on things outside of relations to human beings, but of which the true and the false may be uttered, although it is inconceivable that such utterances meet with verification or rejection. They live by definition through *genus proximum et differientiam specificam* and discover the geometrical entities they define, instead of defining those that they discover.

M. Poincaré's idealism accords verbally with traditional statements, "an object exists only when it is thought" and "an object can not be conceived independently of a thinking subject," as opposed to the realistic, "the world existed before the creation of man, even before living beings; it would exist even if there were no God or thinking subject." But the general character of his epistemology and ontology puts us in a curious dilemma in interpreting these statements. Either this scientist, whose thinking is most exact in the field of science, experiences an astounding lapse of logical intuition when he enters the realm of philosophy, or else his idealism must be read without those Berkeleian connotations the above quoted idealistic phrases usually carry with them. In favor of the first conclusion is the curious Pythagoreanism by which he defines the objective as that which is common to many minds, and concludes that consequently it can be nothing but mathematical relations, on the ground that while the identity of sense qualities in two observers can not be established, the scientific equivalents of them, the mathematical relations involved in their experience, can be.

On the other hand, in an essay contributed to a volume entitled "La Matérialisme Actuelle"[19] and in the sixth chapter of the "Dernières Pensées" he favors an atomistic and discontinuous account of a deterministic universe that seems quite independent of human consciousness. A definite solution of this problem of interpretation can not be given without knowledge of the theory of consciousness which must underlie these statements, and this M. Poincaré has nowhere given us. If, for example, such a theory had been developed along the lines of the new behaviorism, the statement that the world can only exist in the mind of a thinking being would mean

[19] Paris, 1913; contains also essays by Bergson and others.

that the world, as man knows it, is merely an organization of objects thrown into a practical perspective by their relations to the possible modes of activity latent in the human or animal organism and, in connection with epistemology, that objects are only aspects of an ultimate, isolated (made objects) by these demands for action. On the other hand, a representative theory of consciousness would lead to an orthodox Berkeleianism difficult to harmonize with the ontology and epistemology. The evidence left us is so slight that it would be illegitimate to conclude in favor of either interpretation.

When we examine the character of the formulæ by which we express our knowledge, we find three distinct types. First, there is a class of verifiable propositions of the sort that lead experimentally either to verification or to refutation. In either case they are useful, for, if immediately rejected, the false ones at least narrow the field of investigation and the very experiment which rejects them may suggest a new hypothesis to replace the old, and thus be a great aid to discovery, because when an hypothesis that pretends to take into consideration all the factors in a given situation fails, it can only mean that some unknown factor is present, something unexpected and extraordinary which, without the false hypothesis, might have been a long time overlooked.

The second class of hypotheses consists of general statements that are useful to us in fixing our ideas, but which can not be submitted to experimental tests and so can not be affirmed or denied. The principle of the conservation of energy is such an hypothesis. The only condition that makes it true is that we enunciate it for a strictly isolated system, but this condition can never be realized in a system upon which experimental observation is possible. Yet it is of the highest value, for it expresses something that a large number of scientific laws have in common. Its very generality guarantees its unverifiability. But if the principle has a meaning, may it not be false? It may well be that we have not the right to apply it indefinitely even though it is certain to be verified in the strict sense of the term. We shall know when we have reached the limits of its applicability by the fact that it ceases to be useful in the prediction of new phenomena and it will stand condemned without being contradicted.

The third class of hypotheses are such only in appearance. They are really what M. Poincaré calls disguised definitions or conventions. "These conventions are the work of the free activity of our mind, which, in this domain, recognizes no obstacle. Here our mind can affirm since it decrees, but let us understand that while these decrees are imposed upon our science, which without them would be impossible, they are not imposed upon nature. Are they arbitrary?

No, else they were sterile. Experiment leaves us our freedom of choice, but it guides us by aiding us to discern the easiest way. Our decrees are, therefore, like those of a prince, absolute but wise, who consults his counsel of state."

The discovery of an hypothesis is an interesting case of creative imagination and M. Poincaré has contributed an important chapter to the psychology of this problem. Certain of the dominant factors of discovery are possessed by every one. In the first place the creator must be able to reason; in the second, he must be able to remember, and in the third, he must possess a certain sensibility less easy to define. All men should be able to understand mathematics, for all men go through the same thought processes as the mathematician, but some men can not remember mathematical facts surely enough to retain long series of mathematical reasonings, just as some men can not retain the dominant facts in a game of chess well enough to be good players. But the last factor of creation is by no means common to all. In discovery, there is presented to thought countless combinations from which those most likely to fit the situation in question are selected, but the creative act is not merely one of selection, for to the real creator many combinations are not even presented. Only the useful ones present themselves, or at least those that have a fragmentary utility that may be rejected later as inadequate. A long period of fruitless work often precedes, rejected combination after rejected combination, then suddenly, at a quite irrelevant moment, such as in the midst of a conversation, or a walk, the proper idea appears with a strong feeling of illumination and certainty that can only be justified or refuted by later work. Unconscious work has evidently been taking place. But M. Poincaré is loath to accept this as evidence of a subliminal self as a causal factor while any other plausible hypothesis remains. What may happen is that an automatic combining and recombining takes place until certain combinations having a peculiar affinity for our emotional consciousness occur and bring themselves to our attention. The most original part of his discussion is the interpretation of this feeling as esthetic, a feeling of "the harmony of numbers and forms, of geometric elegance," and there have never been finer pages written than those following on the relation of the beautiful and the useful; for not only is the sense of harmony the determining cause in the selection of facts and scientific creation, but it is also the instigator of the endeavor from which results that flash of intellectual light which is the essence of man's brief terrestrial career.

"The scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful. . . . Of course I do not here speak of that beauty which

strikes the senses, the beauty of qualities and appearances; . . . I mean that profounder beauty which comes from the harmonious order of the parts and which a pure intelligence can grasp. This it is which gives a body, a structure, so to speak, to the iridescent appearances which flatter our senses, and without this support the beauty of these fugitive dreams would be only imperfect, because it would be vague and always fleeting. . . . And we need not fear that this instinctive and unavowed prepossession will turn the scientist aside from the search for the true. One may dream a harmonious world, but how far the real world will leave it behind! The greatest artists that ever lived, the Greeks, made their heavens; how shabby they were beside the true heavens, ours!

"And it is because simplicity, because grandeur, is beautiful, that we preferably seek simple facts, sublime facts, that we delight now in following the majestic course of the stars, now in examining with the microscope that prodigious littleness which is also a grandeur, now in seeking in geological time the traces of a past which attracts because it is far away.

"We see, too, that the longing for the beautiful leads us to the same choices as the longing for the useful. . . .

"Whence comes this concordance? Is it simply that the things which seem to us beautiful are those which best adapt themselves to our intelligence, and that consequently they are at the same time the implement this intelligence knows best how to use? Or is there here a play of evolution and natural selection? Have the peoples whose ideal most conformed to their highest interests exterminated the others and taken their place? All pursued their ideals without reference to consequences, but while this quest led some to destruction, to others it gave empire. One is tempted to believe it. If the Greeks have triumphed over the barbarian, and if Europe, heir of Greek thought, dominates the world, it is because savages loved loud colors and the clamorous tones of the drum which alone occupied their senses, while the Greeks loved the intellectual beauty which hides beneath sensuous beauty, and it is this intellectual beauty that makes intelligence sure and strong."[20]

The "Dernières Pensées" gives us our only glimpse of Poincaré's moral philosophy,[21] and much of the discussion here is limited to the relations between science and morals. Morality for Poincaré is ultimately based on feelings, hence there can be neither a scientific morality nor an immoral science. Science can help us to foresee what consequences follow if we act in a certain fashion. It can also cultivate

[20] "Science et Méthode," Ch. I.

[21] *Loc cit.*, Ch. VIII., "La Morale et la Science"; Ch. IX., "L'Union Morale."

our sense of harmony and our love of truth. It can develop habits of generalization so that we can see the furthering of our personal interests as subordinate to wider interests, but it can not prove a moral law and must contradict our idea of liberty, except in the sense in which Fouillée construes this idea itself as a moving force. Half science only is dangerous, for facts remain what they were before they were articulated in scientific language. The power of morality can not be weakened by an understanding of its secret force: "Is gravitation less irresistible since Newton?" Life presents itself as a strife in which now this and now that triumphs, and moral education consists in organizing this strife to make as efficient as possible our energies which are, in this relation, our feelings.

And the popular attitude toward science, as expressed by the appropriations of governments, recognizes its ideal value. Astronomy is one of the most expensive of the sciences, from the point of view of research, yet governments never hesitate. And how is astronomy useful?[22] It raises us above ourselves and makes us conscious of our power through its eternal presentation of harmony and law. It is a prototype for our analysis of matter. "The stars send us not only that visible and gross light which strikes our bodily eyes, but from them also comes to us a light far more subtle, which illuminates our minds. . . ." Astronomy taught man that there are laws from which he can not escape, and with which there is no possible compromise. It has taught him also the essential character of law, for from Newton he first learns that law is a necessary relation between the present state of the world and its immediately subsequent state. It has also taught us to set aside appearance. "The day Copernicus proved that what was thought the most stable was in motion, that what was thought moving was fixed, he showed us how deceptive could be the infantile reasonings which spring directly from the immediate data of our senses." It has freed us from the illusion that the world is made for man and it has taught us not to fear big numbers. It may be that the stars will become a "majestic laboratory" and "gigantic crucibles" for the chemist; "perchance, even, the stars will some day teach us something about life." Indeed, Poincaré is fond of repeating, it is astronomy that "has made us a soul capable of comprehending nature."

The value of science does not, then, rest in any material achievement in a utilitarian sense, and it is not a mere servant of man through which he attains a dull mastery of an existence which he can subject to his caprice, but science is rather the assertion of that cosmic law through which man becomes more finely molded than the beasts. And everywhere it is mankind, and not men, that truly

[22] "La Valeur de la Science," Ch. VI.

succeeds, and truth, in the legitimate sense of the abstraction, rather than loved truths. "Just as humanity is immortal, although men suffer death, so truth is eternal, although ideas perish, because ideas beget ideas as men beget men."[23]

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MUSIC AND EMOTION

THE esthetic emotions have long figured as one of the least understood parts of the subject-matter of psychology. Psychologists have called these emotions "pseudo-emotions." And, after bestowing upon them such an uncomplimentary title, they proceed to admit that upon the whole "they are something of a mystery." The name, "pseudo-emotion," seems to imply a suspicion that the arousal of emotion through the arts is in some sense not quite normal. Works of art are contrasted with ordinary stimuli as "artificial" to "natural" stimuli. However, when one recalls the age-long alliance between music and the dance, between music and religion, and between music and song, such a contrast seems to be inappropriate. The universality with which music is utilized as a means of man's self-expression would afford indication of the accommodation of the organism to such stimuli. The writer is convinced that, at bottom, music (and all the other arts, for that matter) rests upon the exploitation of that sort of exciting agency which is the "natural," innately appropriate, and adequate stimulus for the calling forth of an emotion through the excitation of the sense-organs. In this paper I wish to undertake to throw some little light upon the connection of music and emotion. The mechanics of the correlation admit of a certain amount of explication. I must preface my remarks, however, with the admission that I can offer little more than suggestions of the direction in which research, I believe, might profitably proceed.

The point of difficulty in understanding the connection of music and emotion is not the general fact that music arouses emotion, but the necessity of finding specific differences in the music-stimuli to account for the specific differences in the various emotions aroused. Air-vibrations seem to be a most colorless medium. That mere air-vibrations should form an exciting agency for the whole gamut of human feelings, its martial ardors, its loves and hates, its joyances and sadnesses, is truly an astounding fact! Equally astonishing in their own way, doubtless, are the effects of pigment and pencil, marble and bronze, and the word-jewelry of the poet. But the medium of music apparently is so diaphanous and intangible, and its

[23] "Savants et Ecrivains," page 175.

appeal so intimate and organically profound, that the ostensible inefficiency of air-vibrations to elicit such responses seems all the more glaring.

It is to be noted, to begin with, that the feelings evoked by sound are often regarded as less definite subjectively than feelings as ordinarily occasioned. In every-day cases of the experience of emotion we can generally specify the object which has called forth the emotion. Or, more correctly stated, the tangibility of objects and situations to which we react emotionally and the frequency with which certain practically identical situations lead to emotional response lend a definiteness to ordinary emotions that is obscured when the stimulus has the intangibility of tonal air-vibrations. With certain exquisitely organized individuals, however, musically evoked emotion appears to be as precise and meaningful as a beggar's rejoicing over the gift of a needed coin. How to explain this definiteness for some individuals is a somewhat involved problem.

Music arouses various kinds of emotions, and there must be some sort of differences between one bit of music and another to parallel the differences in the emotional responses the several pieces of music produce. Why one piece of music gladdens and the other saddens must ultimately be explained by differences in the sound-complexes. This is the crux of the problem. The question is: what differences in the various complexes of air-vibration can be found to account for the specific differences in the experiences of the listener?

On the one hand we have the emotion, on the other the stimuli, that is, air-vibrations. The emotions are varied. They are not vague, at least not to the musically enlightened. They possess a certain exactness, a definitive outline. Often we recognize and name them. Such and such music renders us gladsome; other tone-sequences depress. Some we call funereal. Other musical phrases are indubitably provocative of other frequently experienced emotional tones. If then the emotions differ specifically we must seek specific differences in the stimuli to correlate therewith, just as we correlate one vibration rate of the ether with a certain red, another with a certain green, and so on. Pieces of music resembling one another in emotional value we should expect to find resembling one another in structure. I hope to be able to show that such specific differences exist and such a correlation can be found.

There are two factors to be laid bare. The first concerns our innate organization. The second deals with the familiarization, through the experience of the individual, with certain musical conventions and the myriad associations that go to determine our reactions. It is obvious that the second depends on the first; it arises as a result of, and, as an inheritance, tends to develop further, the first factor.

The first factor is biological: the second is a product of history. The latter represents the elaboration and utilization of the material afforded by the first factor.

To begin with the first factor. For the purposes of this paper we need not consider in detail the various theories concerning emotion and instinct. The interrelation of the two is pretty generally admitted. Now it seems clear that certain types of stimuli are what may be called the organically appropriate and adequate stimuli for evoking instinct and emotion. Furthermore, the bodily expression of an emotion in one individual is often itself a sufficient stimulus to elicit a similar reaction in other individuals. One animal in a herd may be frightened by some unusual occurrence and this, as we say quite properly, is contagious, so that it is communicated to the others of the herd. Yet these others may not have been at all aware of the unusual occurrence. Similarly, with regard to human beings, we speak of the contagion of joy.

In the human being, too, an emotion may result from the occurrence of the appropriate stimuli. And certain broad differences in a given type of stimulus, such as sound, will determine general divergences in the responses. The manner in which the stimulation occurs, and of course the condition of the organism, will also be partial determinants. Thus a loud sound, unexpectedly sudden in its appearance, is apt to cause almost any one to experience fear. In the human herd, too, emotions will arise in one as an organic echo of a disturbance in another person. The infant vibrates emotionally in response to delicate shadings in the voice of the mother even before it understands her words. With increasing experience we learn to react to slighter and slighter differences in the intonation of voice and to subtler and subtler distinctions and nuances in stimuli. The effects secured by the art of acting depend largely on these facts. These slight differences, acquiring different sets of widely ramifying associations, become pulled further and further apart. As a consequence the reverberations of our organisms become more and more correlated with these nuances that may be undiscriminated by consciousness.

It is in this fact of our innate organization that determines us to respond to stimuli in certain more or less definite ways that I find the primitive link between music and emotion. To the extent to which a given piece of music considered as complex air-vibration resembles the vibration-complex which is the stimulus that, with reference to our innate organization, is the appropriate stimulus for a certain emotional response, to that extent will the piece of music evoke that same emotion. Neglecting minor elements in the process, we can put it in this way: if a sound-complex, characterized by mov-

ing in a certain range of pitch, with a general movement tendency within the range, and also distinctive in coloring owing to its overtonic complex, larger and smaller periodicities of rhythm, and so forth, produces a given type of emotional reverberation; then a sound-complex represented by a piece of music that is known to evoke that same type of emotional excitement will be found to have a general resemblance to the first sound-complex. In the same manner the sound-complex of a human voice *expressing* this sort of emotion will resemble the two other sound-complexes. The vocal expression, the "musical" sound, and the organically appropriate stimulus will be found to resemble one another. They will not be identical, of course, but taken in the large they are similar. The music (which presumably is the resultant of an emotionalized condition of the composer) resembles the vocal expression of the emotion simply because the art of composing depends ultimately on the exploitation of what I have called the primitive link between stimulus and organic tendencies to respond.

We have a great deal of more or less direct evidence in support of this contention. Since the correlation between bodily attitude and expression on the one part, and the emotion, on the other, is rather definite, we may consider the resemblances of bodily expression and music and in this wise find the correspondences between the music and the emotion.

Consider martial music as an example. The readiness with which one falls into step in obedience to its rhythm, the erectness of bearing, the general tightening of the muscles, the flash of the eye, and the heightening of bodily tone can be observed in almost every listener. Of course, such attitudes are most apparent in the naïve unreflecting person, whose actions are not constrained by the petty inhibitions of convention; for some people seem to believe that they are lapsing into barbarism whenever they permit free expression to an emotion. Now consider the music itself. All martial music shows, as a rule, certain general uniformities. Its characteristic range of pitch which various examples approximate is indicated by the predominance of the brass in such music. The melody, the focal point of attention, is most frequently given to the brass, especially to such instruments as the cornet, trombone, and horns in general. Military music has always been the music of the brass. The walls of Jericho fell to the sound of trumpets! A certain vigor and obviousness of accent and forward propulsion characterize the rhythm, and the fitness with which the martial step conforms thereto is evident. And brass instruments, and, so far as I can discover, instruments like the fife and bagpipes, tend to approximate a characteristic wave-form. Such instruments are said to owe their timbre largely to the pre-

dominance of the higher overtones coincident with the relative feebleness of the lower overtones. These instruments form the center of gravity of a military band. Now in the same connection, consider the human voice. The martial thrill is apt to voice itself in upward tendencies of pitch within a range somewhat higher than in ordinary moments; it also is apt to become more vibrant, sharper, brighter. In this we see a general resemblance to the martial music. That is, the vocal expression resembles the musical expression, and both fitly parallel the bodily attitude.

I do not pretend, of course, to have exhausted all the factors in this account. Suffice it to show that there is a resemblance, and that various pieces of martial music resemble one another as much as various martial emotions resemble each other.

The dance affords further corroboration of my point. When dancing is an art, we find that the music, the bodily movements, and the emotional reactions show mutual congruity and compatibility. A striking, if somewhat notorious, example of this is to be found in the correlation of "rag-time" and what is called "rag-dancing." A musician once told me that the sorts of dancing, indiscriminately called "rag," were the true movement corrolaries of "rag-time" music. One has but to observe a negro ragamuffin dancing along the street to appreciate the truth of the statement.

The opera affords a more complex and yet more exact confirmation. Here the unity of effect is secured by the congruity and concordance of several elements: the music of the orchestra, the voice of the singer, the words sung, and the acting proper. We can sometimes discern that the music of the orchestra does precisely what the human voice (not necessarily a singing voice) would do when freely giving vent to the very same emotion that the music of the orchestra is supposed to portray. Examine similar tragic moments in the scores of various operas—they will be found to have certain general uniformities of structure. And the human voices in moments that are tragic resemble one another in pitch, tone-quality, and the like. Furthermore (and here is the essential point), the vocal expression and the music also resemble each other. Why then the music evokes that sort of an emotion is easy to see.

For illustration we can take Wagnerian motifs. The motif of Isolde's exaltation in the love-death, the motifs of the Redemption by Love, the Sword, the Siegfried, Guardian of the Sword, show similarities amidst their differences. And they are similar in type, although differing specifically, in their emotional value. The exaltation of Isolde, the exaltation of the Redemption by Love, the heroism of the Sword, and the Siegfried are all emotions that elevate and uplift. Perhaps we may make a very general division of emotions

into two classes: those whose tendency is uplifting and those whose tendency is depressing. The four motifs mentioned would then fall into the first class.

Now as regards the sound-complexes, all four show an upward tendency in pitch; the first two rise rather high in the scale of pitch. The latter two are enunciated principally by the brass, but move through a lower range of pitch; they lie well within the range that is associated, as seen in many examples of music, with the heroic, the valorous, and the martial. The interesting correlation is that all four move upward in the scale of pitch, all four are of the class we have dubbed uplifting, and this upward movement is generally characteristic of the human voice when expressing freely such emotions.

An illuminating contrast is afforded by motifs like the oath-motif, the dragon-motif, the fate and death motifs, and the music accompanying Hagen. They express the fearful, the awesome, the terrible, the tragic. Their range of pitch is low, very low; the movement is downward, and the sound-complex is properly rough and raucous. Consider the human voice under the dominance of the terrible, the awesome, the tragic—does it not evince the same general characteristics? It is certainly not smooth, mellow, or mellifluous; on the contrary, it is apt to be hoarse, cacophonous, low-pitched, even sepulchral.

Turn to songs. The analysis of a really successful one lays bare important correlations. Suppose that the song is a poem of real merit set to befitting music. It can be observed that the emotion verbally expressed is closely paralleled by the music: climaxes coincide; transitions from major to minor and the reverse coincide with similar transitions in the poem. And the singer's voice, obedient to the music, works in a manner similar to its changes if the poem were properly read instead of sung to music. Pushing the point further back, we see that the music is emotionally adequate because it has exploited the organically appropriate provocative of the emotion, and so parallels the vocal expression of the emotion.

This should be sufficient to indicate that there is a general analogy between the sounds in music which call up a certain type of emotion and the tendencies in the vocal sounds that commonly occur in the expression of that same emotion. So far, it is true, I have emphasized only the sound-complex, and there are other factors of great, if not of equal, importance. Tempo, for example, enters in decisively in some cases. We can sometimes infer from the gait of a man something concerning his mood. A brisk, tripping step is very different from a slow, heavy, dragging pace. Two tempos in music, so contrasted, differ as strikingly in emotional value. It is as difficult to conceive of a funeral march in anything but a slow, solemn tempo as it is to

imagine a mourner skipping along happily in the funeral procession. Sadness of heart and a nonchalant demeanor are as incompatible as a funeral march played in a gay swinging tempo is artistically impossible. And the artistic impossibility of the latter is directly dependent upon the physiological incompatibility of the former. Tempo, therefore, is also a determinant of the emotional value of sound.

Rhythms of a subordinate nature are also effective elements in calling to life emotional attitudes. Subordinate rhythms within the larger rhythm of the musical measure are often so prominent as to indicate national types of musical composition. In that musical glorification of the unexpected, "rag-time," these minor rhythms are the chief determinants of the effects of such music. It is worth noting in this connection that "rag-time" requires a rather peculiar sort of temperament and a rather definite sort of mood in the performer in order that it can be played in such a manner as to please even those to whom such productions are worthy of attention. At the hands of certain rare individuals, "rag-time" playing is almost an art. And the elements of the rendition that make it attractive to some persons are elements that are not indicated in the score. The performer literally has to read them into the score. In the last analysis it turns out to be mostly a matter of subordinate rhythm and accent.

There are still other lines of evidence that might be appealed to in corroboration of the general contention. Onomatopoetic words, vowel sounds, and the like, throw light upon the point. Sufficient has been given to show, however, that in music the primitive link which relates music to the heart of our inner lives, and so to human instinct and emotion, is the utilization of the innate correlations between sound-characteristics and emotion, and the additional fact that the habitual expression of an emotion on the part of one person is itself apt to evoke a similar emotion in others. Music has seized upon this connection, and in all its development has never disavowed it. In the history of the growth of musical theory and the means of musical expression, this innate correlation of stimulus and response is the starting-point, the propulsive force, and the raw material of the movement.

A word of caution is appropriate in this place. One must not over-rationalize the process of musical expression. One can not assume that the composer is aware of the psychological and physiological facts upon which his art depends. His choice of key, of mode, of tempo, of orchestral emphasis, is regulated by their felt appropriateness to his mood and emotion. Or if we say that such choices are determined by the technique of his art, that technique is

continually being justified by his reactions to the effects of the laws of his art. Musical theory did not create itself. Mathematical relationships may underlie all music, but mathematics did not give us music. And just as we must not over-rationalize the composer, we must not over-rationalize the auditor. The listener reacts immediately to the music; or if his attitude has the aloofness of critical judgment, the basis of the criticism is the felt appropriateness of the music.

So much for the innate factor. The second factor, the influence of experience, of associations and conventions, supervenes upon the innate factor and develops it. We learn to associate types of music with activities, events, sentiments, and moods. Think of the associations that cluster about a funeral march! Or a mass of Gounod! One may say that it is now a musical convention that a certain sort of music should have such and such a characteristic range of pitch, such and such tendencies within the range, and such and such tempos. But convention, however developed in the theory of the art, does not explain its own origin. Funeral marches have certain recognizable characteristices because at bottom such characteristics are an adequate means of expression for a given emotion and the adequate stimulus for the arousal of that emotion.

This does not diminish the significance of the rôle of history in our experiences of music. Intervals that are regarded as harmonious owe to history their acceptance as harmonious. Only a few decades ago augmented chords were scandalous bits of futurism. The daring of the whole tone scales of Debussy will probably have disappeared for the composers of a few decades hence. We shall learn to react to such things just as we have learned to react to the innovations of Wagner. Conventions and associations that determine our responses are as much a product of the development of music as they are a cause; and they are neither cause nor effect without the innate susceptibility of the organism of which so much has been said. Conventions, associations, familiarizations—in a word, the sum-total of our musical experiences—do not explain the intensity and imaginative sweep of our reactions. It is necessary to realize that such influences have their *raison d'être* in our innate structure.

A final objection remains to be met. It may be said that there is no such uniformity or constancy in our reactions as this contention would lead us to expect. We do not always respond to a given piece of music in the same way. Our responses vary from time to time and from individual to individual. To this objection, however, one might retort that there is as much constancy and uniformity in our reactions to music as there is in our reactions to anything at all. Besides, I believe it could be maintained that there is greater uni-

formity the higher the type of music considered. That uniformity may be obscured by the fact of the extreme complexity of a symphony as compared with a simple song, and the further fact that only a small minority of people react to any extent emotionally to the higher kinds of music. This may be due to lack of innate susceptibility, or lack of experience, or what not. After all, many are called to hear popular tunes, but few are chosen to hear symphonies. However this may be, I think the objection may be disposed of if it is remembered that a response is determined as much by the condition of the individual at the moment as by the stimulus.

It is apparent that if our position be tenable, the modern orchestra is the most adequate means that we possess of expressing that which can be expressed musically. This statement would doubtless receive general assent. There are tone-complexes that can not be produced save by the orchestra; there are literally some musical thoughts that can not be expounded save by the orchestra. The solo instrument, within the range of its possibilities, produces its effects by approximating the sound-complexes to which we are organically resonant. And the human voice is the most flexible of all instruments, for the stimulus it affords is the direct expression of an emotion.

When one considers the complexity of the phenomena which I have been trying to analyze, a lack of definiteness and simplicity of formulation in the results seems somewhat excusable. Many musical experiences remind one of religious experiences. The difficulty of analyzing the latter is well known. I have only striven to show that the power of music over those "whose heart-strings are a lute" is not wholly inexplicable. To such as these, the magic of tone and the wings that music lends to imagination are phenomena so profound that nothing less fundamental than inherited tendencies of our organism would afford a satisfying basis of explanation. Our responses to such stimuli themselves unavoidably suggest that the secret power of music arises from, and comes to rest in, certain intricate tendencies of our innate structure.

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THE SYSTEM OF TRANSCENDENTAL VALUES

A FEW years ago[1] the present writer offered certain suggestions on the problem of the classification of values. Three general groups were distinguished—factual, ideal, and transcendental values. The first group was defined as involving adjustment of the organism to its environment, and included the values of logical truth, utility,

[1] This JOURNAL, Vol. VII., pages 282–291.

and agreeableness; the second group was defined as involving a felt harmony between the organism and some part of its environment, and included the values of beauty, goodness, and religious truth; the third group was defined as involving a complete harmonization between the organism and its entire environment, but the task of naming the values in this group was postponed to some future time. I now seek the opportunity of completing this unfinished task.

In my former article, factual values were entitled "values of adaptation," ideal values, "values of harmony," transcendental values, "values of perfection." At this time it seems better to name the last group "values of completeness." Notwithstanding the ill-repute into which idealism, especially in its absolutist form, seems to have fallen in recent years, I make no apology for taking my position on this unpopular platform, nor for using the despised term "transcendental" to name one of the classes of values. Absolute idealism has its devoted defenders, who need no assistance from me, so I take its standpoint for my own without feeling called upon to defend that position.

By the transcendental, it was explained in the former article, "is meant the ultimate and complete as contrasted with the instrumental and fragmentary." Logical truth, utility, and agreeableness bring us into contact with our environment, but not into harmony with it: beauty, goodness, and spiritual truth bring us into harmony with parts of our environment, but not with the whole environment. Partial comprehension without actual felt harmony is won through our contact with facts, partial harmony without comprehension through our absorption in the ideal; but "a completely rational and comprehensive attitude toward the world is won only by a thorough recognition and realization of the harmony of all reality," and of our relations therewith. Perhaps light will be thrown on the problem of the transcendental values from our former consideration of the concept of meaning.[2]

A fact, we have seen, has meaning so far as it is related essentially to some other fact, but the *complete* meaning of any fact involves all its relations to every other fact in the universe. In the universe, however, there are three distinct categories of facts—facts of the physical world, of the mental world of each individual self, and of the social world of interacting selves—facts of the outer world, of the inner world, and of the fellow world, as Münsterberg calls them[3] —or, more briefly still, physical, mental, and social facts. Though the meaning of any particular fact may be defined in part in terms of some other particular fact, it is more fully defined in terms of the

[2] This JOURNAL, Vol. XI., page 184.

[3] "The Eternal Values," page 80.

general category to which that fact belongs. Thus, the meaning of any particular physical fact is with any degree of completeness determined only by its relations to and in the entire cosmic system, the meaning of any particular mental fact by its relations to and in the entire stream of individual consciousness, and the meaning of any particular social fact by its relations to and in the entire social organism.

But are these larger wholes themselves meaningless? The scientific concept of nature as a cosmic system may serve to give meaning to physical facts which in their isolation would be meaningless, but what is the meaning of the cosmic system as a whole? The scientific concept of evolution may be of value in explaining certain particular facts, in that a given fact may be said to have a purpose so far as it promotes the general evolutionary development of nature: but what purpose does the evolutionary process, as a whole, fulfil? These are philosophical questions, and their persistence in men's minds bears witness to an instinctive dissatisfaction with the merely scientific view of nature. This dissatisfaction idealism overrules by its concept of a spiritual world underlying nature, a world-purpose which transcends the mere causal succession of phenomena, and gives them a deeper meaning and an eternal value.

In the same way mental facts are meaningless apart from the stream of personal consciousness of which they are passing phases, and acquire meaning only in relation to that entire stream; but is the stream itself meaningless? It may be true that mental facts have for their purpose the furtherance of the life of the individual, but has that life in its wholeness no purpose or value? Psychology the science generalizes no further than the stream of consciousness, but the idealist insists that personality, selfhood, lies deeper than the stream of mental states, and that the assertion of a spiritual life transcending the natural is necessary to give meaning, purpose, and value to the series of mental facts.

In the same way, again, the individual self may acknowledge his insufficiency apart from the community, may find his complete meaning and value only in his relations to humanity at large, and may conceive his life-purpose to be to share in the life of his fellow-men and advance the interests of civilization. But what is the meaning of humanity? what purpose does society, as a whole, fulfil? is civilization itself valuable, and if so why? Again we find a host of questions pressing for solution, and in reply the assertion of a spiritual life underlying and binding together, not only the separate mental processes of the individual conscious stream, but also the separate individual members of society.

But we must not postulate any dualism between the facts and the

values thus distinguished. The spiritual world is no double of nature, but nature itself spiritualized or evaluated, infused with meaning and purpose. We may as scientists analyze the fact called nature, or we may as philosophers interpret the meaning and value of nature. So the spiritual life of the individual is not a separate life parallel to the natural life, but the natural life spiritualized or infused with meaning: the psychologist may analyze the fact called mind, but the philosopher seeks to understand the personality revealed through the separate mental processes. So, again, it is the spiritual significance of social life, not the phenomena of that life, in which the social philosopher is interested; but the phenomena and their significance are of course inseparable.

Relatively complete meaning, then, is given to nature in the recognition of nature as a partial expression of spirit, to our individual mental life in the recognition of it as a partial expression of an eternal spiritual life, to our social life in the recognition of it as a partial expression of a universal spiritual life. These are our "transcendental values" which complete all lesser values. But such completeness is still only relative: the final step in the interpretation of the three "worlds"—physical, mental, and social—consists in their correlation and unification as still partial expressions of an Absolute Being. If the Absolute comprehends all reality, every fact which means anything at all will find its complete meaning only in that Absolute; if the Absolute is a living reality, every purposeful fact must have for its highest purpose the sharing in the life of the Absolute; if the Absolute is personal, every finite self must find its deepest and most lasting satisfaction in the Absolute Self.

In religious worship man feels himself to be living this higher spiritual life in intimate relationship with the spiritual world. This spiritual world the religious man calls Heaven, the spiritual community the Kingdom of Heaven or Kingdom of God; the Absolute Self he denominates God, and his individual personality he calls his soul. Philosophers shrink from the use of these terms because of their varying and often extremely vague religious connotation, harboring a special contempt for what religion calls "the immortal soul." The latter antipathy is, I am convinced, due largely to the substantialist doctrines usually connected by the "plain man" with his notion of the soul: regard the soul as a substrate, and the objection fairly holds —think of it in terms of meaning, purpose, and value rather than of substance, and the objection holds no longer. Considering that the ordinary religious man talks of his "soul" with such freedom and innocence of offense, and probably will continue to do so to the end of the chapter, it would seem to at least one humble philosopher better worth while to attempt to clarify this notion, than to expend vain

efforts in the futile endeavor to destroy it. The term "heaven" we may think it best to surrender to religion for its exclusive use, but "God" and "the soul" philosophy needs as well. Religion is a life of communion with God and the spiritual world: Philosophy an attempt, but only an attempt, to understand this life and its objects. In these pages we have been making this attempt through the instrumentality of the concepts of meaning, purpose, and value.

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REVIEWS AND ABSTRACTS OF LITERATURE

Immanuel Kant's Leben. KARL VORLANDER. Philosophische Bibliothek. Band 126. Leipzig: Verlag von Felix Meiner. 1911. Pp. 223.

It is rather astonishing that so little should have been written on the life of Immanuel Kant when his doctrines are dealt with in thousands of volumes. The biographies of Arnoldt, Rudolf and Johannes Reicke, Warda, and others are incomplete accounts presenting to us only certain parts of his life. Even in the works of Kuno Fischer, Paulsen, and Kronenberg the biography constitutes merely an introduction to the study of Kant's system of philosophy. Schubert's biography, published seventy years ago, was the only complete account that we had of the life of Kant. And yet, as Vorlander points out, Schubert's edition adds nothing new to the former publications,[1] contains many inaccuracies, and valuable as it was for its own time, has now become obsolete in the light of the new facts revealed by the more complete publication of Kant's letters, and by the last ten years of fruitful investigations.

Vorlander sets himself the task of presenting a complete account of Kant's life chiefly from his own correspondence and from documents now at our disposal. Although he endeavors to avoid controversial discussions, he subjects former biographies to sharp criticism and many are the errors which he points out in those works.[2] The book contains six chapters and is supplemented by two pages on the sources, a chronological table, and an index of proper names. Side by side with Kant's life we have a picture of his time and a very interesting account of Kant's successive relations with Knutzen, Green, Haman, Herder, Lambert, Moses Mendelsohn, and others.

As an analysis and historical development of the philosopher's thought has already been given in Vorlander's edition of Kant,[3] to which the present volume is a supplement, he studiously avoids here the exposition

[1] It does not seem to mark a great advance on the edition which appeared immediately after Kant's death under the common title of "Immanuel Kant," the well-known joint publication of three different works written by Borowski, Yachman, and Vasianski, and published by Frederick Nicolovius (Koenigsberg, 1804).

[2] See pages 2, 5, 11, 16, 18, 19, 25, 35, 41, 63, 164.

[3] *Cf.* the "Philosophische Bibliothek."

and criticism of Kant's works. Only of a few of the least known writings of 1750 and 1770 is an attempt made to give an analysis, as these were not included in the Bibliothek edition. Moreover, he purposely omits the treatment of Kant's attitude towards politics, religion, and art, reserving this, as he tells us, for a future volume.

In thus systematically remaining within the biographical limits the author succeeds in presenting us a simple and natural narration not only of the outer events, but also of the inner life of Kant. He has shown us that this very simple and quiet life, devoid of external commotions, and with few great epochs, was not without its inner emotions and conflicts which, when understood, throw light on Kant's moral doctrines. Vorlander's deep insight can be seen in his most interesting account of Kant's inward struggles at the time when the reactionary government of Prussia forbade him to teach his own philosophy. The philosopher of the categorical imperative who bids us not to lie even when the life of a human being is at stake faces the necessity of being sincere with himself at such a critical moment in his life. From some of his papers at that time we find that he seals his struggles with the consoling compromise that "if everything we say must be true, it is not our duty to divulge all truths." We have in Vorlander's volume many other picturesque portraits of Kant at the height of his powers and also some very touching ones as an old man abandoned by all his friends and even by his own mind.

This volume leaves us with a somewhat different impression of Kant than most of the biographers are wont to give us. Here we have not the secluded and solitary Kant, "who was born, lived, and died in Koenigsberg." But it is the more human side of this stern philosopher that is put before us. We see him not only in the class-room with his pupils, but also in the kitchen with his servants, teaching his cook the transcendental principles of cooking. It is a Kant of universal interests that could even write a "Kritik der Kochkunst," as his friend Hippel said of him.

The style of the book is pleasant, clear, and almost picturesque. Those acquainted with Vorlander's other works on Kant will find here the same clearness and scientific scrupulousness that characterize them.

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Advertising and Selling: Principles of Appeal and Response. HARRY L. HOLLINGWORTH. New York: D. Appleton and Company. 1913. Pp. xiv + 314.

As stated in the preface, this book has resulted from the cooperative attempt, on the part of a group of practical business men and one or two individuals whose interests were chiefly scientific, (*a*) to formulate and systematize those facts and laws which relate to the processes of appeal and response in the selling and advertising of goods, and (*b*) to undertake investigations which might result in the discovery of new facts and principles of both practical and scientific interests.

Especially worthy of consideration is the theoretical discussion and the report of experiments having to do with methods of attracting attention. The conclusion is reached that the greatest change in modern meth-

ods of advertising is to be brought about by a substitution of interest incentives for mechanical devices as a means of attracting attention.

Under the discussion on association of ideas the observation is made that the business men are violating some of these laws in a most unfortunate way. They are causing us to think watch when we think of Ingersoll. They should cause us to think Ingersoll when we think watch. They teach us to think of Christmas presents when we think of Copley Prints. They should teach us to think of Copley Prints when we think of Christmas presents.

Experiments are described in which the relative merits of typical types of appeals were determined by laboratory methods. Actual advertisements were also tested in the same way. Based upon these experiments, the inference is drawn that the advertisers could avoid much needless expense by thus testing types of appeals and concrete advertisements before running the advertisements in the magazines and newspapers with the necessary enormous expense.

This contribution to applied psychology is a model in that it sacrifices nothing to popularity and at the same time is interesting and practicable. Each chapter is worthy of study by both the practical business man and the professional psychologist. In this book we have another example of the value of the behaviorist's point of view.

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NOTES AND NEWS

At a meeting of the Executive Committee of the American Philosophical Association in New York City, on March 8, it was voted that the next meeting of the association be held in Chicago on December 28, 29, and 30, in conjunction with the Political Science and American Historical Associations. The three associations will participate in a joint discussion on a topic to be announced later.

For discussion in the Philosophical Association, the following topic is proposed:

"The interpretation of justice, with special reference to problems forced to the front by present economic, social, and political conditions."

A more definite formulation of this topic will be announced after another meeting of the Executive Committee in June. In the meantime members of the association are invited to offer, either by correspondence with the Secretary or by publication, suggestions looking to further definition of the topic and possible restriction of the scope of the discussion.

(Signed) E. G. Spaulding,
Secretary.

A Conference on Individual Psychology was held at Columbia University, April 6–8, by former pupils of the Department of Psychology. Among the thirty-odd names appearing on the programme were those of Professors Brown, of the University of California, Woodrow, of Minnesota, Henmon, of Wisconsin, Jones, of Indiana, Breese, of Cincinnati, Ruediger, of George Washington, Gordon, of Bryn Mawr, Dr. Wells, of McLean Hos-

pital, Dr. Bruner, of the Department of Child Study of the Chicago Public Schools, and many from New York and vicinity. The topic of individual differences was considered on many sides, in regard to sense discrimination, reaction time, attention, intelligence, susceptibility to practise, as well as with reference to education, vocational guidance, pathology, and anthropology. At the close of the Conference, the members gave a complimentary dinner to Professor James McKeen Cattell, in recognition of the twenty-fifth anniversary of his first appointment as Professor of Psychology. He was presented on this occasion with a volume entitled "The Psychological Researches of James McKeen Cattell: A Review by Some of His Pupils," the authors being Messrs. Henmon, Dearborn, Wells, Woodworth, Hollingworth, and Thorndike.

THE following note on "The Art of Refusing Manuscripts" is reprinted from the *Journal des Debats:*

"Le rédacteur en chef du *Tsin Pao,* journal chinois, reçut un manuscrit qui ne méritait pas d'être inséré. Cet accident est commun à tous les directeurs; diverses formules sont employées, qui adoucissent la blessure en même temps qu'on la fait. On dit le plus souvent: 'Votre manuscrit est excellent, malheureusement il ne serait pas compris du public.' Ainsi, l'auteur malheureux est exalté en même temps qu'évincé; le directeur se tire d'affaire tout en agissant d'autorité, et le lecteur est à la fois calomnié et épargné.—On peut encore invoquer la ligne du journal, ligne magique, mobile, et défensive, éternellement opposée au solliciteur. Si le sujet est neuf, il est facile de décliner l'honneur d'en parler; et s'il ne l'est point, il est aisé de refuser l'article. On peut encore invoquer l'absence de place, la susceptibilité des rédacteurs attitrés; on peut même accepter le manuscrit: c'est un des plus sûrs moyens de ne jamais le publier.

"Ainsi font les grossiers Occidentaux. Mais la politesse des fils du Ciel est exquise. Le rédacteur du *Tsin Pao* écrivit en retournant le manuscrit refusé: 'Très vénérable frère du soleil et de la lune! Ton esclave se courbe à tes pieds! Je baise le sol devant toi, et j'implore de toi la permission de parler et de vivre. Ton manuscrit, très vénéré, a passé entièrement sous nos yeux, et nous l'avons lu avec ravissement. C'est avec peur et tremblement que je vous le renvoie. Si je me hasardais à le publier, le président m'ordonnerait aussitôt de prendre ce bijou pour modèle, de ne plus jamais m'en écarter, et de n'avoir jamais la hardiesse de rien publier qui lui fût inférieur. Or, ma longue expérience des lettres m'a appris que de telles perles ne peuvent être produites qu'une fois, une fois tous les dix mille ans. C'est pourquoi je dois vous la rendre. Je vous en conjure, pardonnez-moi. Je suis à vos pieds, esclave de vos esclaves.'"

The Editors trust that all friends of this JOURNAL appreciate that these are their sentiments on any similar occasion.